1:Stanford U. S-4, 5 1956 AF16 SW China
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248 If we use 1949 as the base year (100),
433 the average yield per unit of land was 134 in 1952, 156 in 1953, and 164 in 1954 and 1955.

D. Other Agricultural Products

244 Southwest China's production of edible
433 oil (excluding soybean oil) surpasses the majority of regions in China, and the output of oil from rapeseeds ranks first on the Mainland. It was estimated that the total production of rapeseed oil in Szechwan Province alone amounted to 108,000 metric tons (118,800 tons) in 1955, an increase of 28 per cent over the amount produced in the preceding year.[20]

249 In addition to the production of rapeseed,
245 Szechwan Province is also the chief producer
433 of sugar cane and oranges. Tremendous quantities of sugar cane are grown on the plains of Chengtu; the output of sugar cane in 1955 was 1,180,000 tons more than the output
245 in 1949, according to one report.[21] The
433 oranges and tangerines grown in Szechwan fill all local needs and are exported to other parts of China as well as to the Soviet Union

20. China Daily News, New York, Aug. 31, 1955.

21. Wen-hui Pao [Wen-hui Daily], Hong Kong, July 25, 1955.

2: Rock K-5 (1934-) 1947 AF16 Southwest China AF16

flows along its eastern margin — *k'a* being a ravine. The Chinese name of the hamlet is Wen-hua-ts'un 文華村. Formerly it was known as San-chia-ts'un 三家村, as originally only three families lived there. To-day there are eighteen.

The most northerly village on this part of the plain, situated at the actual foot of the snow range at an elevation of 9,400 feet, is Nv-lv-k'ö, consisting of about 100 families (PLATES 74, 75, 76).

South of Wùa-dtv k'o-dü, on the main road to Li-chiang and east of Pai-sha, is the hamlet T'a-bbu-d'a, called in Chinese T'ai-p'ing-ts'un 太平村. T'a-bbu-d'a was originally one of the 12 *d'a* (residences) owned by the Mu family. It was the place where they worshipped their ancestors; when performed in the sixth moon, the service was known as *T'a-bpö*. To the east of T'a-bbu-d'a is a small hamlet of seven or eight families called Nda-la-k'o-dyü, also belonging to Mu-tu-ts'un.

Another larger village consisting of over 100 families, called Nyi-mä-t'u-ts'an in Na-khi, and in Chinese, Hsiang-yang-ts'un 向陽村 (Facing the sun village), is north-east of Pai-sha.

Rice cannot be cultivated on this northern part of the Li-chiang plain, as the soil is too stony and there is not enough water to irrigate the fields, furthermore the altitude is too great. The Na-khi plant wheat, maize, potatoes, barley, oats, beans and peas also the rape-turnip *Brassica rapa depressa* which they call *ngyu* (the *man-ching* 蔓菁 of the Chinese). The tuber itself is called *'a-k'ö*. Opium was also grown for Chinese consumption. South of and in the actual neighborhood of Li-chiang, opium was grown in the spring, and rice during the rainy season.

Gv-bö, in Chinese, Chiu-tzu-hai 九子海 (Nine lakes) is a district lying east of the long limestone spur which hems in this part of the plain. It has been settled only recently. Peasants from the village of Pai-sha-kai have started homesteads and planted fields. Previous to the settling of the Na-khi, a few Li-su and Lo-lo had built their poor huts there and carried on cultivation. The Chinese name is derived from the several circular basins which are filled with water all the year round.

The range in which is situated Gv-bö, better known as Gv-bö la-zhĕr gko [the name appears also in Na-khi literature, and has reference to the tigers which once roamed in its forests and meadows: *la* = tiger, *zhĕr* = sound, noise, *gko* = alpine meadow], is composed of old limestone. The sharp rocks projecting through the mass of scrub oak (*Quercus semicarpifolia*), give it a peculiar aspect. The highest point of this range is the triangular peak Lv-zhĕr-dsu (H-M., Lajatso), approximately 12,000 feet in height. The best approach is from the village of Nv-lv-k'ö or Ssaw-ssu-k'a, whence the ascent can be accomplished in about three hours. From its summit one obtains a glorious view of the entire Yü-lung Shan, that is, the part south of the Yangtze gorge. The northern end of the Li-chiang plain is covered with low pines and oaks (PLATES 77, 78), especially scrub oak; many herbaceous plants with beautiful flowers form lovely carpets in the summer months, and enliven the otherwise grey, stony waste.

Immediately east of the village of Nv-lv-k'ö is a low, circular mound, looking for all the world like an extinct volcanic cone. It is known to the Na-khi as La-lo-dtò-gkv, including a small ravine to the north of it. On the top of this

769 Ancestor worship is institutionalized to an amazing extent. Not only the very large and wealthy families and clans but also the ordinary well-to-do ones have a separate ancestral temple. All go to great lengths and expenses to ensure good sites for family graveyards according to geomancy. In order to make sure that the fortune of the family will be on the up all the time it is the custom to change graveyards to new sites when the old ones have become suspect. Old imperial honors granted from Peking have been and are still highly valued. Walking through the town and its villages one senses upon numerous plaques of honor on the portals to many family homes.

249 Not many years ago, before the advent of the power of the Central Government into the province, opium growing was general. George B. Cressey prints in his book, China's Geographical Foundations (1934) a photograph showing "Fields of Opium Poppy Outside the Walls of Yunnan-fu" (Kunming). This sight is no longer common today, especially in the more communicable parts. In the remoter interior of the province, the author has been told, opium is still being grown. Opium smoking is certainly very widespread everywhere in the province. Opium-growing in this town and its satellite villages was formerly the source of income for many families, and the trading of the commodity has enabled many families to become wealthy, indeed. The prohibition of its plantation has caused many small farmers to sigh about the passed "golden age," but has not prevented the wealthy families from making even more profit out of the new scarcer supply. These facts have at least been partly responsible for the wealth of West Town.

556 West Town contains a disporportionately large number of wealthy families. These families are not mere local stars. They are rather outstanding even in the larger provincial cities and in Kunming. One year ago the top of these families performed a funeral that lasted over two months and cost about one million national dollars. Even the lesser ones are also considerable. Soon after the fabulous funeral the wedding of the young master of a small one-room cloth store in the town cost ten thousand national dollars while the wages of laborers in the town were still about two or three dollars a day with board.

556 178 743 871 This wealth has perhaps given rise to the over-emphasis on the ancient ways as regards imperial honors, ancestor worship and sexual differences. But in recent years a few wealthy families have also supported in the town three schools, a hospital and a public library. The hospital has about twenty beds, one graduate nurse, two medical officers (both M.D.'s, one was trained in Peiping Union Medical College), a number of assistant nurses and a nursing training class. It has arrangement for free medicine and hospitalization for the poor. The schools are: one middle school, one primary school divided into two parts, and one normal school. The three schools combined have a total enrollment of about 1,400. The first and second schools are co-educational. The principal of the middle school is a local man who has studied in Ts'ing Hua University, Peiping.

Influences from Outside

491 492 205 Before the days of the Burma Road, motor transportation was scarcely known to this region and communication with Kunming took about two or three weeks one way. After the opening of the Burma Road the town was soon connected with the Road by a sort of badly constructed highway. But the principal mode of travelling is still pack horses and "chairs" (Hua Kan). Since about two years ago there has been a third-class post office receiving mail from Kunming once in two days.

5: Davies G-5 (1894-1900) 1909 AF16 Southwest China AF16

CHAPTER XX

TA-LI FU TO YÜN-NAN FU.

Chao Chou—The Ming-chia tribe—Hung-ai—The capital of an ancient kingdom—Yün-nan Hsien—"Two foreign officials, one black and one white"—Meeting with Watts-Jones—His line for a railway—A region of lakes and ponds—Wild geese and duck—A bare dry sandstone country—Meeting with Ryder—Chên-an Chou—A poor town—Ch'u-hsiung Fu—A conservative population—Six Englishmen meet—Ker goes northward to the Yangtze—Woman falls into a well—Belief in medical knowledge of Europeans—Kuang-t'ung Hsien—A broken-down city wall—One name for natives of Europe and India—The Ta-li *tao-t'ai's* jurisdiction—Lu-fêng Hsien—Anning Chou—Yün-nan Fu—Wretched inn—Europeans in Yün-nan Fu—The city and lake—The Arsenal—Two-man rifles—The climate of Yün-nan Fu.

AFTER two days' halt at Ta-li, Ker and I started again on the 1st of March and, passing through Hsia-kuan, reached Chao Chou, a town of 600 houses near the S.E. corner of the big lake. It is a poor-looking place compared with Ta-li or Hsia-kuan, but it seems to be growing, as they had lately enclosed some additional space within its walls. The inhabitants, like those of the Ta-li plain, are chiefly of the Ming-chia tribe, though there are many Chinamen among them, especially in the town.

The next day a very gradual ascent brought us to the top of a low range, from which we descended somewhat steeply by a dangerously slippery paved road to a fine well-cultivated plain in which splendid crops of opium are grown. There is no official city here, and the principal place in the plain is the large market village of Hung-ai. We had now left the Min-chias behind and found ourselves again among a purely Chinese population. Hung-ai, "red precipice," was formerly called Pai-ai, "white precipice," and is celebrated in the ancient history of Yün-nan as the capital of one of the old kingdoms destroyed by Pi-lo-ko in 749 A.D.

[p. 149]

5: Davies G-5 (1894-1900) 1909 AF16 Southwest China AF16

round in a circular furrow, into which the paddy was thrown. 407
It was worked by a water-wheel which revolved horizontally
like a turbine, teeth being arranged all round the outer 376
edge of its top surface to catch the water.

We had heard cuckoos everywhere round us for the last 136
few days. The bird appears to be the same as the English
cuckoo, and in western China as in England it makes its
appearance in April, though I think in the Shan States I
have heard it as early as March.

My mules went straight along the main road to Yang-kai 000
the next day, but I made a slight detour to see Hsün-tien
Chou which lies a little off the road. It is a small, poor
town in a rather well-cultivated plain with the upper waters
of the Niu-lan Chiang running through it. The Tao-t'ai 631
of eastern Yün-nan has his residence here. His district
comprises Chao-t'ung Fu, Tung-ch'uan Fu, and Ch'ü-
ching Fu.

It rained most of the day and we did not reach Yang- 000
kai till seven in the evening, as the march with the circuit to
Hsün-tien must have been 24 miles.

The next day we passed Sung-ming Chou which lies a
mile to the right of the road[1]. The town is a small one,
but it stands in a good plain, measuring about 10 miles
each way. Exceptionally fine opium is grown here and at 249
Yang-kai. The poppy flower of Yün-nan is usually white,
the next most common colour being mauve or purple.
Scarlet poppies are occasionally seen but they are not
common.

After crossing the plain the road leads over a lot of 000
uncultivated undulating ground. As there was some delay
in changing our escort at Sung-ming, I went on without a
guide. Going off to the right of the road to put up my
plane-table, I tried to make a short cut back, and got on to
the wrong path, a mistake which we did not discover till we
met a man a mile or two on. We then struck across to the
left but found so many well used tracks made by timber-
hauling from the fir woods in front of us, that it was most
difficult to pick out the right road. We could see no village
and could find no one to ask the way of, and as it was

[1] What is considered the main road passes a little further to the east through Yang-lin, but the route I took is rather the more direct of the two.

1 [village of Liu-shu-ho -- Analyst]

5: Davies G-5 (1894-1900) 1909 AF16 Southwest China AF16

and of the Shan States and the lower lying valleys of Yün-nan; but I have never before or since seen it at anything like such a high elevation as 6,200 feet, which is about the height of the T'ung-hai plain.

Crossing a range of hills we descended steeply down a narrow gorge to the Ch'ü Chiang valley, which being only 4,800 feet is warm enough to grow sugar cane, a valuable product in Yün-nan. The river which waters this valley is 100 yards wide and is fordable at this time of year, being also crossed here by a wooden footbridge. Later on in the rains the water rises and mules have to cross by a bridge two miles lower down, just where the river leaves the plain.

I have reason to remember the footbridge, for the man who was in charge of my pony, so as not to wet his own feet, tried to lead him over the bridge. As it was made of narrow planks not very carefully joined together and the whole structure was decidedly shaky, the natural result was that the pony fell off it when he had got half way across. It was an anxious moment when I heard a shout from behind and looked back to see the pony hang for a moment and then fall. Luckily he was not hurt, though there was a considerable drop.

Our hopes of getting through the day dry were disappointed, as, before we could reach our night's quarters at Kuan-yi, a heavy thunderstorm burst, which wetted us to the skin in a few moments.

On the 20th May a march of 17 miles took us to Hsin-fang, a village in the Lin-an plain, where we put up in a temple. We were below 5000 feet here and in a much warmer climate than the traveller in Yün-nan is accustomed to, while the mosquitos reminded us that we were now in the rainy season. Luckily we had a clear night and I was able to take the latitude, the only observation I got between Yün-nan Fu and Tong-king.

The town of Lin-an Fu lies five miles off the road to the south and I had not time to visit it, but I made a slight detour the next morning to the top of a low spur, and I was able to fix its position.

The town is said to contain 1000 houses: it lies in a plain of considerable extent, but only narrow strips along

000 The next day we crossed the Shweli-Salween watershed at 8,700 feet. The range is not so high here as it becomes north of the T'êng-yüeh-Ta-li road, where its peaks rise to 12,000 feet or more.

Sleeping at Pai-ta, which stands on a sort of little terrace in the hillside overlooking the Salween, we descended the next morning by an exceedingly steep path to what is often known as the P'an-chih-hua ferry. It should be more correctly called Chuan-shui, as the real P'an-chih-hua is a mile or two lower down and is now disused as a ferry.

The Salween here runs between hills which are not quite precipitous, but are so steep that one may say that the river banks are 3000 feet high. No goat track could possibly go straight up them. They are ascended by steep zigzag paths. The river is here at an elevation of 2,100 feet, and the highest peak on the range to the west of it, though only 6½ miles off in a straight line, is 10,100 feet. The ferry is not on any main road, so there was only one somewhat water-logged raft, and the crossing of 140 yards of deep swift-flowing water was a matter of time.

563 197 [304] [249] We slept at Ma-lu-t'ang, a village which with four others in the neighbourhood is inhabited by Lo-los, who still use their own language, but have in other respects adopted Chinese customs, even to the extent of their women binding their feet. The few people who exist in this part of the Salween valley get a living principally by growing tobacco and opium.

On the 5th we reached the large village of Yao-kuan, where I had slept a night in the previous year on my way from Yung-ch'ang down to Kun-long. I found the inhabitants just as inquisitive and ill-mannered as they had been on my former visit. 712 In one of the little plains passed through on this march we found the ruins of a Mahommedan fort, built during the rebellion of 1854–1873. They say the rebels held out here for three or four years, and what remains of the fort is most solidly built of large blocks of stone.

000 Our next march was chiefly downhill, leading us into the valley of the Yung-ch'ang River, where it runs through the little plain which the Chinese call Wan-tien and the

5: Davies G-5 (1894-1900) 1909 AF16 Southwest China AF16

000 the stream. Below the plateau it disappears into deep gorges among the hills bordering the Yangtze.

361 On the 14th February we reached Hui-li, a town of 3000 houses with a good wall round it. It has broad streets and is more prosperous looking than any of the towns of Yün-nan, except perhaps the capital of that province. Its chief products are opium, tobacco, indigo, and copper. The copper mine is at Lu-ch'ang, six miles south of the town, and as Mr Ker had seen it the previous year I did not visit it. Indigo is to be seen growing everywhere in the fields, covered over at this time of the year with straw to preserve it from the frost. The large tanks in which they mix the dye are found in nearly every village as well as in the town. The height of Hui-li I made 6,250 feet.

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5: Davies G-5 (1894-1900) 1909 AF16 Southwest China AF16

is chiefly cultivated. Of the mountain ranges some are rather bare, covered with grass or fern only; others are well clothed with fir woods, or at lower elevations with semi-tropical forests. To a traveller accustomed to the vast jungles of Burma, Yün-nan would appear a bare country, but it would seem well wooded when compared to the barren hills of the north-west frontier of India. It is in fact neither a very bare nor a very thickly wooded province. No doubt there was formerly much more forest, but the wants of the inhabitants in fire-wood and house-building have entailed much cutting of timber, which has never been replaced by planting. The amount of cultivation in the hills varies much according to the density of population and the fertility of the soil. In places nearly the whole hillside is fields; in other parts one may go for miles without seeing a clearing. In eastern Yün-nan especially the soil is often so dry and water so scarce that cultivation is hardly possible.

The principal crop of Yün-nan is rice. This is the staple food of the Yünnanese, and it is only in very out-of-the-way hill villages that the people are too poor to afford it and have to live on maize or millet. All the plains that are capable of being irrigated are given up to rice cultivation throughout the summer.

The rice harvest is in October, and when this has been reaped, a second crop of opium, wheat, or beans is in many places sown for the winter.

I should estimate the relative quantities grown as about half opium[1] and a quarter each of wheat and beans. It is not, however, every plain that is capable of producing this second crop off the ground from which the rice has been reaped. When this cannot be done some of the plain land is usually kept unsown with rice, so as to be used for winter crops.

In the hills rice is also extensively grown. In many places the sides of the valleys can be dug into terraces and irrigated by the little hill streams, and here good crops are obtained. In less favourably situated localities the rice

[1] Since this was written, however, the opium crop has been considerably diminished, as Hsi Liang, the present Viceroy, caused all poppies near Yün-nan Fu to be pulled up in Dec. 1907. Along the main routes and for two or three days' journey round the capital scarcely any opium has been grown in 1907–8.

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crop is dependent on the rain for its water, and where there is any jungle this is cut down and burnt, the wood ashes helping to manure the ground. Maize, millet and buckwheat are also grown on the hills, and opium is one of the chief things cultivated. This latter crop is an easy one to raise, and the produce finds a ready sale. Opium cultivation is certainly increasing in Yün-nan.

Among other agricultural products of the province may be mentioned tobacco, which is largely grown in many districts; tea which comes principally from the Chinese Shan States south of Ssŭ-mao; sesamum and other oil-producing seeds; hemp used for making rope; sugar which will only grow in the lower and warmer valleys; walnuts, persimmons, pears, peaches and other fruits, and many different kinds of vegetables.

As to livestock, there is nothing as big as what we should call a horse, but ponies and mules are kept everywhere. Pack animals are the principal means of transport in the province, so that they form a very necessary possession both to farmers and merchants.

To the farmer cattle and buffaloes also are essential as a means of ploughing his fields, for ponies and mules are never employed for this purpose. In the deep mud and water of the irrigated rice fields buffaloes are the only animals that can do the ploughing.

Unlike the Shans the Chinese do not use bullocks as pack animals. It is true that in out-of-the-way places a farmer may occasionally be seen taking his produce to market with a mule saddle fastened on to a bullock or cow, but this is exceptional. There are no trading caravans of bullocks. In some of the plains of eastern Yün-nan bullocks and buffaloes may be seen drawing small carts, but these can seldom find a road good enough to lead from one plain to another, and are only used for farming purposes.

Nor are cattle considered by the Chinese as of any use for food. The orthodox Chinaman does not kill cattle to eat, and it is only in towns which contain a good many Mahommedan inhabitants that beef can occasionally be got. As to milk it is practically unknown in China. A little is now sold in Yün-nan Fu, but it is only in the Tibetan corner of the province that cows are regularly milked.

5: Davies G-5 (1894-1900) 1909 AF16 Southwest China AF16

Opium is produced in Yün-nan far beyond the requirements of the province, and is largely exported into other parts of China[1]. The opium of Yün-nan is considered by the Chinese to be of very fine quality, though not quite up to the standard of Indian opium. 249●

Hemp, which at present is not much cultivated, might easily be extensively grown and exported for rope making. Many kinds of *fruit*, which will not grow in the tropical climate of Burma, thrive in Yün-nan, and even now form a fairly important export. These are apples, pears, quinces, peaches, apricots, cherries, persimmons (dried like figs), chestnuts, and walnuts. Yün-nan *tea* is famous all over China. There is not likely to be much trade in this commodity to Burma, but a railway through to Ssŭ-ch'uan should carry considerable quantities. *Livestock* already forms one of the principal exports from Yün-nan into Burma. Mules, ponies, cattle, and buffaloes are all far cheaper in China than in Burma, so that they can be sold at a profit in the latter country. Sheep are cheap in China, and do not thrive in the warm climate of Burma. At present slaughter-sheep are imported into Burma from India. 245 439 231 439

There are in Yün-nan large grazing grounds which are lying idle because there is not sufficient demand for live-stock. If the farmers had a ready means of disposing of their surplus animals, the flocks and herds of the province would doubtless largely increase. Moreover the trade which now exists in *horns* and *hides* would grow at the same time, and *wool* might become a most important article of export. 237 439

Among minor exports in which a considerable trade might spring up may be mentioned *pigs' bristles*, *ducks' feathers*, and the *white of eggs* for albumen; also from the Tibetan part of Yün-nan *furs* and *musk*.

As to minerals, *gold* has always been an article of export, chiefly in the form of gold-leaf to gild the Burmese pagodas. Whether *other metals* could be profitably brought into Burma or India is a question that cannot be decided till the mines have been more thoroughly examined, but 316 439

[1] This was written before the recent restrictions on opium-growing. See footnote on p. 311.

7: Hu K-5 (1934-) 1946 AF16 Southwest China AF16

Another interesting characteristic of this agricultural area of the northern Basin is that this area is the most important producing center of a very important semi-agricultural product, the herbs, in the Basin. In addition to the meager subsistent agricultural production, the herb furnishes as a very important "cash crop" for the farmers. This is mainly due to the fact that in this area there are large tracts of land where the slope is too steep and the soils are too shallow for regular crop production. These lands are used, either in cultivated form or in "wild growths" for herbs.

Other outstanding features of this agricultural area include its moderate population density (Fig. 10), its specially thick cypress growths, and the conspicuous absence of coal, iron, nanmu, and pine vegetations.

4. The Combined Agricultural and Forestry Area of the Eastern Basin

In terms of both the agricultural prosperity and the general appearance of its agricultural landscape, this combined agricultural-forestry area of the eastern Basin (Fig. 24) is the least attractive and poorest. Here the topography is dominated by the numerous steep high parallel anticlinal ridges. Plains and gentle hills are even more restricted.

As to soils, in addition to the usual "purple-brown" type of the Basin, there are numerous tracts of soils, old and young yellow earths, which are derived from limestone parental materials. In most cases these soils are shallower in depths than the purple-brown type and are much slower in the rate of renewal. These factors handicap considerably its efficient agricultural production.

The principal crops here are potatoes, hemp, rice, corn, wheat, and kaoliang. Although rice is reported to be grown in every district of this agricultural area, its acreage is more limited here than in any other agricultural area.

The agricultural land-use of this area is controlled largely by its topography. Agricultural lands here are derived from two principal sources, first, on the manger-like trough lands at the top of the broad anticlines wherever the bed rocks happen to be less resistant than the surrounding structures. These trough lands are, however, rather restricted in extensions.

7: Hu K-5 (1934-) 1946 AF16 Southwest China AF16

244 occupies about 4,000,000 mow, or 4 per cent of the total crop land. Kaoliang, sometimes called false millet, is a staple dry crop on hilly lands. It is noted for its special capacity to be without water for a long time (longer than corn) without drying to death. The choice of these two crops by farmers for a certain [273] area often depends on this point. Besides being used widely for human consumption, as well as for livestock feed, kaoliang is used mainly (between 70 and 80 per cent of the total crop) for the manufacture of wine, the famous kaoliang wine. This last use proves to be particularly advantageous to the farmers because wine can be transported to far distant markets when the sale of bulky grains, owing to prohibitive transportation costs, is difficult.

243 e) Wheat.--The most important winter food crop is wheat (Triticum Sativum). It normally occupies about 15,000,000 mow, or 17 per cent of the total crop area, and the Basin has an annual output of 44,000,000 piculs (Fig. 35). The Basin is the fifth largest wheat producer in all China. With the exception of the Chien-chiang district (which for reasons unknown does not produce wheat), wheat is produced as a winter food crop in nearly all parts of the Basin, particularly in the districts around Chengtu Plain. The wheat prefers the more clayey soils of the Basin, and gives a particularly good yield.

The crop matures generally in 150 to 170 days. In most parts of the Basin, the field is seeded in the middle of October and the harvest takes place in the early part of May, depending upon the latitudinal position, as well as the topography of the area. Next to rice, wheat is the most important food crop of the Basin, contributing 12 per cent of the total food supply. It is eaten in the form of "mien" (noodles) or in other forms of dumplings.

249 f) Rape seed.--The Basin leads all China, both in area and in total annual production of rape (Brassica juncea; a winter crop). Normally it occupies an area of 11,000,000 mow, or about 10 per cent of the total crop area, and the annual output is 15,000,000 piculs[1] (Fig. 35). From the rape seed, oil is extracted for cooking and many other purposes. The seed cakes also furnish

[1]Bureau of Central Agricultural Research, Agricultural Statistics (1939), p. 97.

7: Hu K-5 (1934-) 1946 AF16 Southwest China AF16

a very important source of fertilizer. It is the most important source of vegetable oil supply of the Basin. Recently, research projects have been launched by the Central Chemical Research Bureau of China to study the possibility of using rape-seed oil for manufacturing synthetic petroleum and other motor oils for war use. 249

g) Barley and other winter crops.--Other important winter crops in the Basin include barley (Hordeum vulgare), buckwheat (Polygonum fagopyrum), and a great number of species of peas (Pisum Sativum). Barley normally occupies about 12,000,000 mow, or 11 per cent of the total crop area. Second in all China, the Basin's annual total output of barley normally amounts to 31,000,000 piculs (Fig. 35). Barley, like buckwheat, is an important dry winter crop on hilly lands in the northern part of the Basin. These crops generally do not require heavy soil, and call for little fertilization. The total acreage in various kinds of peas and beans is usually about 10,000,000 mow, or about 9 per cent of the total crop area. They grow both on hilly and plain areas throughout the Basin. But in plain areas they are used mainly for inter-culture purposes, with wheat and other crops. 243

2. Special Agricultural Products

a) Cotton.--China's "cotton-belt" lies north of the Yangtse. South of the Yangtse, comparatively little cotton is produced. Geographically, Szechuan Basin lies in a southernmost position among all the provinces north of the Yangtse and is therefore in an intermediate position so far as cotton production is concerned (Fig. 1). The most important cotton producing districts in the Basin lie between latitude 29 degrees and 32 degrees N. Particularly the heaviest concentration is at 31 degrees N., around the districts of the upper Fou River Valley, such as Suining, Shei-hung, Santai, Chung-chiang, and Yen-ting (Fig. 36). These five districts accounted for nearly 60 per cent of the total crop in 1936 (Table 4). 248

In these areas the total annual rainfall generally runs below 1,000 millimeters (Fig. 24). Most of the rain falls during the summer, but there is also considerable rainfall in the early autumn (Table 5). This distribution of rainfall, as we shall see later, is not very satisfactory for cotton production. The soil conditions, however, are quite favorable for cotton production.

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248 of cotton with other crops, such as corn, soy beans, potatoes, pepper, and others, has been found especially undesirable. The inter-culture with corn is particularly disastrous to the cotton because the corn has heavy foliage and competes keenly with the cotton plant for sunlight and moisture. All these factors, whether individually or in combination, have contributed to the failure of cotton culture in the Basin.

Recently, on account of the pressing need for increasing clothing materials, the Bureau of Central Agricultural Reseas has undertaken rigorous projects to improve the unhappy situatio By the beginning of 1940 the Bureau had extended the cotton promotion program over fifty-seven districts of the Basin, with particular emphasis on the cultivation of imported varieties, such as Delfos, Trice, and some improved local strains. Some of thes varieties possess the special virtue of maturing early, before the autumn rains set in and injure the bolls. Cotton control stations have been established in a number of key points (such a Sui-ning, Shei-hung, and Santai) in order to avoid hybridization and to preserve the purity of the improved strains.[1] Moreover, special measures have been taken to discourage the old practice of inter-culture in cotton planting.

249 b) Tobacco.--Tobacco (Nicotiana tobocum), or "Yen," as the Chinese call it, like corn and potatoes, is another plant which had its origin in the New World. It was transplanted to China around 1540 and was first cultivated in the Basin about 1750.[2] The Basin normally produces about one-fourth (an average of 1,500,000 piculs) of all the tobacco produced in China.[3] It is reported that tobacco is produced in fifty-seven districts of the Basin. The principal producing areas are in Chengtu Plain, and there are special concentrations in the districts of Shih-fang, Pi-hsien, Sin-tu, and Ching-tang (Fig. 37). Other importa producing centers include Mei Shan in the south, and Mien-chu in the north at the edge of the Chengtu Plain. The Chengtu Plain area generally accounts for about 60 per cent of the total produc tion of tobacco in the Basin (Table 6).

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[1] Report of the Bureau of Central Agricultural Research (1939), p. 86.

[2] Gazetteers of Pi-hsien, III, 4.

[3] The production figure for 1936 (Table 6) is lower than that for other years due to a serious drought that year.

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Generally speaking, the principal tobacco-producing areas lie between 29 and 32 degrees North latitude (Fig. 37). In these areas the average temperature for the coldest month (January) ranges between 5.8 degrees C. (43°F.)--at Wen-chiang--in the north, and 12.7 degrees C. (55°F.)--at Mei Shan--in the south. The lowest temperature ever recorded is about 2 degrees C. (36°F.). The rainfall throughout the growing season is sufficient (over 40 inches yearly), and the average relative humidity throughout the year is between 75 and 80 per cent[1] (Table 8). These climatic conditions are considered favorable for tobacco growth.

Moreover, the unfailing supply of irrigation water from the Tu-chiang-yen Works has insured even further the sufficiency of the water supply for tobacco production. The soil conditions are also favorable. The soils range from clay loam to loose sandy loam of sufficient depth. In spite of the high relative fertility of these soils, the tobacco fields in Chengtu Plain require heavy fertilization. The application of "lu-tiao" (Astraglus sinensis) as green manure, plowed under during the early spring, is most common.

Tobacco is usually a spring crop within the rice-belt of Chengtu Plain. The seeds are sown in late October and the crop harvested by mid-June. This practice usually delays the seeding-season of rice by two or three weeks (as rice is a summer crop here, following immediately after the tobacco). Consequently, both the yield and the quality of the rice crop are often reduced, the yield sometimes by as much as 20 to 30 per cent. This conflict between tobacco and rice constitutes one of the most serious problems of the tobacco- and rice-producing areas here. Recently, the local Agricultural Experimental Station conducted a number of experiments with a view to selecting an early-maturing variety of tobacco so that it might not hamper the growth of the rice. There is an old saying among the peasants here: "Shih nien tsao, chiu nien hao," literally meaning, "ten years early, nine years prosperous." This vividly expresses the need for an early-maturing variety of tobacco.

On account of the heavy drain which the tobacco crop exerts on soil fertility, rotation systems, commonly with corn, soy beans,

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[1] Bureau of Reconstruction, Szechuan Provincial Government, Meteorological Report (1938).

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249 or peanuts, are practiced in most tobacco-growing areas. Only in the districts of Sin-tu and Shih-fang, in the heart of Chengtu Plain, where soil conditions are especially fertile, has tobacco-cultivation been carried on from year to year without rotation.

The best tobacco leaves are produced in the Shih-fang and Sin-tu districts. They are fine in quality, fragrant in flavor, and are almost ideal for making cigars and cigarettes. The poorest products come from Mien-Chu and Te-yang. Besides supplying the local demand, tobacco leaves and products find their markets in Shensi, Kansu, Yunnan, and Kweichow provinces, and even as far away as parts of Central Asia and Russian Turkestan.

c) Sugar cane.--The method of refining sugar from sugar cane was first imported into China from India during the early part of the Tang dynasty (618-906 A.D.). As early as the reign of Emperor Tai Tsung of Tang dynasty, there was a monk named Tsou, who initiated sugar cane cultivation in the Nan-chung district of the north central Basin.[1] Since then, the production of sugar-cane (Saccharum officinarum) has been steadily developed into a very important agricultural enterprise, particularly around the To River Valley.

The sugar-cane crop thrives well only in a warm, humid climate, ranging from tropical to sub-tropical. During its growing season, the average temperature must be around 20 degrees C. (68°F.), and the average annual rainfall about 1,500 millimeters. At the time of maturity, the temperature must be relatively cool, and the humidity must be low.[2] In most areas of the Basin where sugar cane is produced, the local climatic conditions fall short of these requirements. Instead of having an average annual temperature of 30 degrees C. (86°F.) or 25 degrees C. (77°F.), as in Java and Cuba, respectively, where the most important sugar-cane producing areas of the world are located, the maximum annual average temperature of the Basin is only 17.9 degrees C. (68°F.) (Fig. 24). This temperature is far too low for satisfactory sugar-cane growth. Even compared with the other sugar-cane growing areas in China, such as Kwangtung and Fukien provinces,

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[1] Gazetteers of Nanchung District, IV, 6.

[2] Y. C. Chen, "A Discussion on Improved Methods for Cultivation of Sugar-cane in Szechuan Province," Szechuan Reconstruction Monthly, IV, No. 8 (1933), 29.

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Szechuan Basin has a much shorter summer season and a lower minimum winter temperature.[1]

As a result of this climatic limitation, it is impossible for sugar cane in the Basin to flower. This fact, of course, eliminates at once the possibility of bi-sexual breeding. All the native varieties are therefore produced by asexual reproduction. The tips of the sugar cane crop are cut down in the winter and are buried underground. When spring comes, these shoots are planted. This practice handicaps seriously any attempt to improve the breed. Moreover, while sugar cane in Java and Cuba may continue to grow and produce for two and three years or more, such growth is impossible here in the Basin. The lack of irrigation facilities in most of the sugar-cane fields in the hilly areas has further handicapped its successful growth.

Sugar cane generally thrives better on sandy loam soils (Fig. 38) than on clay loams. In the Basin it is, however, planted on both types of soil. It is reported by farmers of these areas that sugar cane grown in the more hilly areas, where the loose, sandy loams predominate, has a much higher sugar content than that grown on the "Pa-ti," or alluvial plains, where clay loam is the chief soil type. Thus, about two-thirds of all the hilly lands of Tze-chow and Nei-chiang are devoted to sugar cane. However, because good irrigation facilities are lacking in many parts of these hilly areas, many sugar-cane fields suffer serious droughts when natural rainfall falls short.

Rotation systems are commonly adopted by sugar cane growers. The most common practice is yearly alternation of sugar cane with corn, kaoliang, or peanuts. Sugar cane is generally a summer crop. During the winter season, sugar cane fields may be used for wheat, rape, or peas, or may be left to lie fallow.

Although sugar cane is reported to be grown in forty-four districts throughout the Basin (Table 7), the principal producing

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[1] The average temperature of May-September for Canton is above 26 degrees C. (79° F.); for Amoy (Fukien), June-September is above 26 degrees C. (79° F.); but for Chungking, the average temperature for the period between only July and August is above 26 degrees C. (79° F.), whereas for the period of May-September is only 25.8 degrees C. This, of course, means a shorter summer, at Chungking. Moreover, the winter minimum for Canton (January) is 13.1 degrees C. (55.6° F.); for Amoy (January) 12.2 degrees C. (54° F.); and for Chungking (January) only 8.8 degrees C. (47.8° F.) (cf. Annual Report of the Central Meteorological Bureau [1934], p. 32).

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249 areas are concentrated mainly in five districts of the To River Valley, namely, Nei-chiang, Tze-chung, Tze-yang, Chien-yang, and Fu-shun (Fig. 37). In 1936 these five districts alone accounted for 73 per cent of the total crop (Table 7).

There are two principal kinds of sugar cane produced here, namely, the red cane and the white cane. The red cane is used for chewing purposes, whereas the white is used mainly for sugar-extraction. Unfortunately, because of the poor quality of the cane and the inefficient methods of refining, the local sugar production is not only small in quantity (pure sugar production only about 1,000,000 catties), but also poor in quality. Consequently, in the face of keen competition from high-quality imported sugar, the sugar produced in the Basin (with the exception of Chieh-tang sugar, a specially treated medicinal sugar which normally finds its principal markets in the I-chang and Hankow areas) has been driven out of the former inter-provincial markets, such as Yunnan and Kweichow. Moreover, the local sugar cannot even maintain its foothold in the local market. This fact is evidenced by the increasing import of foreign sugar into the Basin.

Sugar cane and cotton constitute two of the most acute problems in agricultural land-use in the Basin. Recently, various programs have been launched by the Bureau of Central Agricultural Research in order to improve this situation. Sugar cane improvement stations have been established in the Nei-Chiang, Tze-yang, and Chien-yang districts. A large number of foreign species have been transplanted from Java and Cuba. It was recently discovered that the species P.O.J. 2878 and P.O.J. 2725, selected from Java breeds, adapt specially well to local environmental conditions in the Basin. They have a 5 per cent higher sugar content than most of the native species. Rigorous attempts are being made to extend these two species among the Basin farmers.[1]

248 d) Hemp.--The two principal species of hemp produced in the Szechuan Basin, namely, the "chu-ma" (Corchorus capsularies) (or ramie, China grass, as it is popularly known in the west), and "hou-ma" (Cannabis sativa), or fire-hemp, as it is called locally. These two species, being produced in different areas with widely different physical requirements, are used for entirely different purposes. The "chu-ma" is further divided into two kinds--the

[1]Chen, op. cit., p. 22.

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As in many other parts of China, tea cultivation here is primarily a by-profession of farmers, and very few large plantations are found. It is reported that there are more than 35,000 farming families engaged in producing tea.

Perhaps nowhere else in China has tea been produced in so many grades and prepared in so many forms as here in the Basin. The grades range from the most handsomely packed silver-needle green tea of finest aroma to the most roughly-wrapped ugly-looking brick tea. This range is made available in order to meet the varied demands of widely different markets. The most important export tea markets of the Basin are the regions of Tibet, Sikang, and Kokonor. The Basin supplies nearly all the demand of these areas, which normally totals more than six million dollars per year.

Nevertheless, this small but profitable trade may soon be denied to the Basin. It is greatly feared that keen Indian competition is growing and threatening the Basin's export tea trade to Tibet. In fact, the competition of Indian tea even now extends from Tibet to the Sikang markets. Geographically, the Indian tea is in a more favorable position to compete for the Tibetan tea market than tea from the Basin. For example, from Darjeeling to Lhasa it is only about 350 miles, while from Kan-ting (Tachien-lu), the principal collecting point of the Basin's tea on its way to Tibet, to Lhasa is twice that distance (nearly 700 miles) and requires sometimes two months' journey. Moreover, the physical difficulties of transportation in the Basin are also greater. This favorable geographic position of India is further evidenced by the fact that a considerable portion of the herbs from the Tibetan highlands are now being exported through the Darjeeling route.

The tea for the export markets comes largely from the western and southern producing areas. Normally Kuan-hsien is the collection-point and Sung-pang the distribution point of all tea from the western producing areas, whereas Yaan and Kan-ting (Tachien-lu) serve in the same capacity for the southern producing areas. The tea for these distant markets is generally wrapped in 60-pound or 80-pound packages and is transported principally on men's backs.

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c) Medicinal herbs.---Szechuan Basin has long been noted in China, in fact in the whole Far East, for its production of a

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249 great variety of vegetable drugs. There are six principal producing areas in the Basin (Fig. 37): (1) the western area, including Sung-pang, Li-fang, Miao-hsien, and Wen-chuan, with Kuan-hsien as the chief collecting and distributing center; (2) the southern area, including I-ping, Ching-fu, Kao-hsien, and Yun-nien, with I-ping as the trading center; (3) the southwest area, including Lo-shan and Chien-wei, with Yaan as the trading center; (4) the northern area, including Chiang-yu, Ping-wu, and An-hsien, with Chung-pa as the trading center; (5) the districts of the Chialing River area, with Ho-chuan as the trading center; herbs from southern Shensi and Kansu also pass through Ho-chuan; and (6) the eastern area, consisting of Kai-hsien, Fu-hsi, Feng-chieh, Kai-chiang, and Liang-shan districts.

249 278 Of these six principal herb-producing areas, the western area is by far the most important. It generally accounts for one-third of the Basin's total production. The medicinal herbs are found in the hilly and more mountainous areas in the Basin, and grow under a great variety of climatic and soil conditions. But, as a rule, the herbs especially thrive well on the more rugged mountain slopes and in the cooler climates.

It is reported that as many as two hundred or more different kinds of herbs (including both cultivated and wild species) are produced in the Basin and its surrounding areas.[1] And seventy-nine of them are prominent in inter-provincial and export trade. Many have been of high value to the Chinese for ages. Recently, some of them have been used extensively even by western peoples, particularly the well-known ma-huang (ephedrine), licorice, Ta-huang (medicinal rhubarb), Huang-nien (coptis chinensis), and many others.

One of the most serious problems in herb production in the Basin is that of bringing more of the valuable wild herbs under cultivation so as to stabilize the production and bring down its costs. It is reported that many formerly valuable wild species of herbs, as a result of human disturbances and reckless exploitation, are now nearly extinct.[2]

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[1] T. H. Cheng, "The Herb as an Important Product of Szechuan," Chinese Science Monthly, XVIII, No. 1 (1932), 28-32.

[2] Ibid., p. 30.

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Prior to the Republic (1912) the export of medicinal herbs, together with silk and tung-oil, formed the backbone of the export trade of the Basin. Herbs alone generally accounted for between 15 and 20 million dollars yearly. But recently, on account of the constant warfare and heavy taxation, as well as the increasing competition of western drugs, the herb trade has reached a low point; in 1936 the total value of herbs exported amounted only to some 7 million dollars. 249 278

Chungking is normally the biggest center for transhipment of herbs to outside markets. It is not only the point of convergence of the herb products of the six main producing areas, but also herbs from northern Kweichou and southern Shensi (by the Chialing and Chi waterways, respectively), are shipped via Chungking, on their way to lower Yangtse markets. Thus, for a long time, Chungking has been known as the "jackpot" of the herb trade of the Far East. The principal domestic markets for the Basin's herbs include Kiangsu, Chekiang, Kwang-tung, Honan, Hunan, and Hupeh provinces, whereas the chief foreign buyers are Japan, French Indo-China, and France.

d) Cho Tsai or pickled (fermented) vegetable.--Cho Tsai, or pickled vegetable, is another unique product of Szechuan Basin, which is the only region in China where this food is produced. Cho Tsai has long been regarded as a great delicacy and a tasty seasoning for cooking in various parts of China, particularly in the lower Yangtse Valley and the North China Plain, as well as in Japan and countries of the South Sea Islands. Large quantities of this delicacy (some two or three million dollars' worth) are exported yearly to these areas from the Basin. 244

The principal producing areas of Cho Tsai are in the east of the Basin, particularly in Pei-Ling, Feng-tu, Chang-shou, Chiang-peh, and Pa-hsien districts (Fig. 37). The products from Pei-Ling and Lo-Chih (Chiang-peh) are especially famous.

This vegetable, locally known as Ching Tsai, being a species of chard, thrives well in a wide range of soil conditions. It requires good drainage. The plant is ordinarily seeded in September after the reaping of the summer crops; and the harvest takes place some time around January or February. During its growing season it requires a humid, mild climate. In many localities it forms a very satisfactory rotation crop with rice.

TABLE 6

PRODUCTION OF TOBACCO IN SZECHUAN (1936)

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Name of District	Total Amount (In Piculs)	Per Cent of Total
Shih-Fang	290,000	48.3
Pi-Hsien	80,079	13.3
Mien-Chu	75,000	12.5
Sin-Tu	45,578	7.6
Wen-Chiang	40,000	6.6
Tsung-Nin	15,000	2.5
Chung-Hsien	6,300	1.5
Ching-Tang	6,000	1.0
Ta-Hsien	5,473	.9
Sin-Fang	4,900	.8
Yun-Yang	4,500	.7
Tung-Nan	4,500	.7
Sui-Ning	3,500	.5
Chia-Chiang	3,500	.5
Kuan-Hsien	2,300	.3
Chi-Chiang	1,600	.2
Chu-Hsien	1,590	.2
Siu-Shan	1,360	.2
Nei-Shan	1,250	.2
Te-Yang	1,200	.2
Nou-Hsi	800	.1
Liang-Shan	750	.1
Peng-Hsi	700	.1
Cheng-Tu	426	.07
Chung-Ching	410	.06
Chiang-An	400	.06
Peng-An	400	.06
Hsin-Wen	300	.05
Yung-Lien	300	.05
Nan-Hsi	200	.03
Kao-Hsien	200	.03
Pa-Hsien	120	.02
Ching-Yen	120	.02
Kai-Chiang	120	.02
Wu-Sheng	115	.01
Chien-Wei	100	.01
Hsuan-Han	100	.01
Chien-Chiang	30	.005
Total	599,221	100.000

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TABLE 7

SUGAR PRODUCTION IN SZECHUAN (1936)

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Name of District	Total Production (In Piculs)	Per Cent of Total
Nei-Chiang	625,000	24.6
Tzu-Chung	625,000	24.6
Chien-Yang	225,000	8.8
Fu-Shun	200,000	7.9
Tzu-Yang	175,000	6.9
Chu-Hsien	100,000	3.9
I-Ping	70,000	2.9
Ching-Tang	60,000	2.3
Nan-Hsi	50,000	1.9
Te-Yang	50,000	1.9
Wei-Yuan	48,900	1.9
Lung-Chang	37,500	1.4
Kuang-Han	30,000	1.1
Jen-Shou	27,225	1.0
Kuang-An	25,000	.9
Tsung-Nai	25,000	.9
Chien-Wei	24,250	.9
	15,000	.5
Mei-Shan	10,000	.3
Sui-Ning	10,000	.3
Shih-Fang	10,000	.3
Sin-Tsing	8,000	.3
Ching-Fu	7,900	.3
Lu-Hsien	7,500	.2
Chi-Hsien	7,500	.2
Yung-Hsien	6,500	.2
Chiang-An	5,000	.1
Kai-Hsien	5,000	.1
Kao-Hsien	3,000	.1
Nou-Hsi	3,000	.1
Ho-Chuan	3,000	.1
Wan-Hsien	3,000	.1
Chiang-Tsin	2,800	.1
Ping-Shan	2,500	.09
Chang-Ning	2,500	.09
Ching-Shen	2,400	.09
Wu-Sheng	2,375	.09
Lo-Chiang	1,875	.09
Peng-Shan	1,795	.06
Lei-Po	1,650	.06
Tung-Nan	1,547	.06
Ho-Chiang	1,500	.06
Mien-Chu	1,400	.05
Yo-Chi	1,250	.04
Tung-Liang	1,000	.03
Total	2,526,867	100.00

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TABLE 8

CLIMATIC CONDITIONS OF TOBACCO-PRODUCING CENTERS OF SZECHUAN
(1936-1938 Average)

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Name of District	Climatic Conditions	Jan.	Feb.	March	April	May
Mei-Shan.....	Temperature (C.)	12.7	14.8	15.2	20.9	23.9
	Humidity (o/o)	77.8	76.1	69.3	68.6	75.0
	Rainfall (mm.)	3.0	....	32.0	56.8	108.5
Lo-Shan.....	Temperature (C.)	7.4	10.2	14.8	19.4	23.3
	Humidity (o/o)	70.1	70.0	58.9	64.6	64.8
	Rainfall (mm.)	1.6	15.0	15.9	64.5	141.2
Chia-Chiang.....	Temperature (C.)	8.6	11.2	....	20.7	28.9
	Humidity (o/o)	75.2	79.0	....	75.5	75.0
	Rainfall (mm.)	2.8	4.7	....	31.0	51.1
Wen-Chiang.....	Temperature (C.)	5.8	9.1	12.6	18.7	22.4
	Humidity (o/o)	77.4	75.8	72.4	72.0	71.7
	Rainfall (mm.)	8.2	23.0	9.3	4.8	102.0
Sin-Tu.....	Temperature (C.)	6.9	9.3	13.3	....	.....
	Humidity (o/o)	88.9	....	....	....	.....
	Rainfall (mm.)	2.0	11.4	5.6	85.0	112.5
Ching-Tan.....	Temperature (C.)	....	7.1	....	....	.....
	Humidity (o/o)	....	....	....	....	.....
	Rainfall (mm.)	....	14.3	....	29.7	.....
Mien-Chu.....	Temperature (C.)	....	8.6	13.2	18.2	.....
	Humidity (o/o)	....	81.1	73.0	71.0	.....
	Rainfall (mm.)	....	4.0	15.7	24.2	.....
Te-Yang.....	Temperature (C.)	6.3	10.1	14.6	19.9	24.1
	Humidity (o/o)	81.1	73.2	64.6	62.7	66.8
	Rainfall (mm.)	11.0	10.3	3.0	27.6	94.9
Shih-Fang.....	Temperature (C.)	....	....	....	19.1	22.7
	Humidity (o/o)	....	....	....	81.2	77.0
	Rainfall (mm.)	....	....	....	21.5	118.6
Pi-Hsien.....	Temperature (C.)	6.1	7.8	14.0	18.8	22.9
	Humidity (o/o)	75.5	75.6	72.9	70.9	73.5
	Rainfall (mm.)	.2	10.5	9.8	31.6	145.3

TABLE 8—Continued

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June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Average
26.5	27.9	27.6	24.4	21.3	15.2	9.4	233.2	19.4
77.8	82.1	70.4	79.9	76.5	73.2	78.1	904.2	75.4
124.1	354.0	366.2	41.3	7.4	1.9	12.8	1047.7	....
24.0	26.1	26.4	22.1	18.7	12.1	9.0	203.5	17.7
75.6	70.2	82.3	84.6	79.1	75.1	80.5	885.1	73.7
81.6	166.4	52.1	216.9	89.1	20.0	21.8	.....	....
24.8	27.5	27.7	23.7	19.1	12.8	9.5	.....	....
77.3	78.5	86.1	.....	....	82.7	88.9	.....	....
101.3	205.7	220.7	116.9	42.2	16.9	40.3	.....	....
24.3	20.0	26.7	22.0	18.2	10.6	3.4	204.8	17.1
78.3	81.8	81.3	82.8	80.9	78.6	76.0	929.0	77.4
161.2	461.6	172.0	205.0	86.4	18.5	9.5	1221.6	....
.....	.....	.....	.....	....	....	8.6	.....	....
.....	.....	.....	.....	....	....	58.4	.....	....
70.0	368.0	126.7	217.5	25.0	3.0	....	1027.5	....
25.1	26.5	.....	22.5	18.5	11.5	8.8	.....	....
78.2	77.7	.....	84.3	80.8	81.3	85.5	.....	....
27.5	263.4	.....	111.5	28.6	5.3	15.0	.....	....
24.3	26.9	27.6	21.5	17.8	10.4	6.6	.....	....
81.9	85.5	84.5	80.8	87.2	88.5	....	.....	....
88.6	424.1	318.7	157.8	44.7	26.9	....	.....	....
21.9	25.4	29.0	22.2	19.0	13.5	9.3	218.3	18.2
78.9	75.1	73.5	80.3	....	77.8	79.3	.....	....
78.0	28.8	67.2	12.8	....	15.2	13.4	.....	....
23.9	25.9	27.3	22.2	18.4	10.8	8.7	.....	....
82.9	81.6	82.4	84.6	79.8	78.3	78.6	.....	....
144.6	48.2	155.1	239.5	21.3	24.0	5.1	.....	....
24.6	25.8	27.1	21.7	18.1	11.5	8.3	260.7	17.2
80.4	83.2	83.4	83.8	82.5	81.9	80.0	943.6	78.6
134.9	311.1	515.1	245.0	30.5	11.8	9.7	1455.5	....